



## Laser fighter participates in war-gaming exercise

*by J. Rich Garcia, Directed Energy Directorate*

KIRTLAND AIR FORCE BASE, N.M. — F-16 pilots that participated in a computerized war-game exercise Oct. 26 were armed with a simulated laser cannon developed by the Air Force Research Laboratory.

During the exercise, called Advanced Concepts Event (ACE), pilots used the newly-developed laser-armed F-16 simulator to become better prepared for aerial combat once laser weapons become available. The simulator also allows Air Combat Command to develop tactics, techniques and procedures that will be needed in future laser battles.

Taking place at Kirtland, ACE is an exercise for all the military services. It incorporates simulators from throughout the country, networked to Kirtland. Officials note that the event offers the intensity of real exercises, providing participants the opportunity to wargame future weapon systems to determine military worth to the warfighter.

This laser simulator, known as High-Energy Laser Fighter, or HEL Fighter, was developed with assistance from F-16 pilots assigned to the New Mexico Air National Guard, another Kirtland-based unit.

“We started this effort nearly four years ago,” said Rudy Martinez, the HEL Fighter project officer at the Directed Energy Directorate. “We wanted to merge an F-16 simulator with a laser weapon system so that a pilot could blend flying experience with the skills needed to operate a revolutionary speed-of-light weapon.”

Martinez said, “A pilot would fly his F-16 differently in a laser battle compared to a more traditional fight using guns or missiles. With guns and missiles, a pilot has to maneuver to approach a target from behind or from the side. But with a laser weapon, that pilot can have more latitude. That’s because the laser fires through a turret mounted underneath the plane. The turret allows the laser to fire on either side or straight ahead, so the pilot doesn’t have to do as much maneuvering.”

“Working as a team, we put together a pretty good simulator,” Martinez said. “But this was not enough. We still needed to get it into the hands of Air Combat Command operators to get feedback on how well it works, whether it was realistic enough or not. So we transitioned it to a facility in Mesa, Ariz., called the Warfighter Training Research Division of the Human Effectiveness Directorate, where they have four F-16 simulators. By loading all four simulators with our model, we were able to fly multiple, simulated, laser-armed aircraft in a single battle.”

The simulators at Mesa are also more sophisticated than the ones at Kirtland, being able to incorporate a 360 degree “out of the cockpit” view in their simulations.

Improvements to the HEL Fighter are in the works. One of those improvements, according to Martinez, is to go beyond reliance on radar to acquire targets in an air battle. Traditionally armed F-16s use radar to locate and zero in on their airborne targets. When using guns and missiles, the entire aircraft is the target and the radar provides the information needed to hit a target. But with a laser, the targeting can be much more precise. A pilot can focus on a particular portion of a target – engines, armament or fuel tanks for example. The simulator program is being modified to provide that level of exactness.

A laser-armed fighter aircraft is still a few years away. Under development are solid-state lasers and compact electrical sources that can power high-energy laser weapons. Until then, Martinez adds, that experience will only be available through simulators like the HEL Fighter and exercises such as ACE. @